

OPTIMAL PORTFOLIO CONSTRUCTION OF PHARMACEUTICAL COMPANIES-A STUDY ON CNX PHARMA INDEX

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ABSTRACT

Stock markets are one of the primary indicators of Indian economy. The index values like NIFTY, SENSEX, BANK NIFTY, CNX PHARMA to name a few; not only gives a first-hand impression of the health of the economy but also directs the government and the regulatory authorities to formulate policies for the better of the Indian growing middle class. This study focuses mainly on the CNX PHARMA index which consists of 10 pharmaceutical stocks and develops an approach to construct an optimal portfolio using the Sharpe Index Model. The model uses the regression technique to analyze the effect of market on the return of individual stocks. Finally, this study advises the risk-averse investors to make a portfolio of Glenmark Pharma, Lupin, Cadila HealthCare and Sun Pharmaceuticals.

KEYWORDS: Optimal Portfolio, Sharpe Index Model, Regression, CNX PHARMA

INTRODUCTION

There are various types of financial products available in the market which provides different rates of return. Financial instruments providing high rate of return are subject to high degree of risk in comparison with financial instruments providing low rate of return. Risk-seeking investors would always invest in the products which have more risk ignoring the level of return. But risk-averse investors always look for the financial products which can provide them maximum return while diversifying all the risk. Investment in the stock market serves to be a milky way of increasing returns in short period of time as compared to investment in the riskless securities. Systematic risk and Unsystematic risk are the two types of risks that an investor faces while making investment in the stock market. However unsystematic risk can be diversified by constructing an efficient portfolio. This study focuses on constructing an optimal portfolio of pharmaceutical companies listed from CNX PHARMA index by using Sharpe's Single Index model.

OBJECTIVES

- To construct an optimal portfolio by considering risk-return analysis of pharmaceutical companies by using Sharpe's Single Index model.
- To determine the proportion of investment to be made in the various selected stocks.
- Providing the investors information which will boost their investment decision.

RESEARCH METHODOLOGY

The study lays emphasis on the construction of the optimal portfolio of pharmaceutical companies listed in the CNX PHARMA. The design of the research study is descriptive in nature. The data used in the study is secondary. The sample size of our study is limited to ten stocks of pharmaceutical companies. The sampling technique adopted is

cluster sampling. Websites of Reserve Bank of India and National Stock Exchange is used for collecting the data. The data of the previous five years i.e., from April 2009 to March 2014 has been used. The total number of days data included in our study is 1247.

TOOLS USED FOR DATA ANALYSIS

Sharpe Index Model

The William Sharpe's single index model is based on the assumption that when the market moves up most of the stock prices also tends to increase and vice versa. Therefore, securities returns are correlated and there might be co-movement between securities because of common response to market changes. This co-movement of stocks with the market index is studied with the help a simple regression analysis:

$$R_i = \alpha_i + \beta_i R_m + \epsilon_i$$

Where, R_i = return on individual security

α_i = independent of the market performance

β_i = measure of the expected change in individual stock return to the change in market return

R_m = return of the market index

ϵ_i = error term representing the residual return

Beta

Beta coefficient is the relative measure of systematic risk. Beta of an investment is a measure of the risk arising from exposure to general market movements as opposed to idiosyncratic factors. The market portfolio has a beta of exactly one.

$$\beta_i = \frac{\sigma_{i,m}}{\sigma_m^2}$$

Return

The total gain or loss experienced on an investment over a given period of time, calculated by dividing the difference in Ending price and Beginning Price during the period with the total period of investment value is termed as return.

Risk-Free Rate of Return (R_f)

Risk-free rate of return is the return on a security that is free from default risk and is uncorrelated with returns from anything else in the economy.

$$\text{Excess return-to-beta ratio} = \frac{R_i - R_f}{\beta_i}$$

Where, R_i = the stock's expected return

R_f = the risk-free rate, β_i = beta, a measure of systematic risk

Cut off Point

$$C_i = \frac{\sigma_m^2 \sum_{i=1}^N \frac{(R_i - R_f)\beta_i}{\sigma_{ei}^2}}{1 + \sigma_m^2 \sum_{i=1}^N \frac{\beta_i^2}{\sigma_{ei}^2}}$$

Where, σ_m^2 = market variance

σ_{ei}^2 = unsystematic risk

Investment to be Made in Each Security

$$X_i = \frac{Z_i}{\sum_{i=1}^N Z_i}$$

Where, X_i = proportion of investment in each stock

$$Z_i = \frac{\beta_i}{\sigma_{ei}^2} \left(\frac{R_i - R_f}{\beta_i} - C^* \right)$$

Where, C^* = cut off point

ANALYSIS AND INTERPRETATION**Table 1: Return and Variance of Individual Stocks**

Name of the Stocks	$R_i(\%)$	σ_i
GLENMARK PHARMA	63.561	0.0570
LUPIN	65.560	0.0827
CADILA HEALTHCARE	54.773	0.0396
SUN PHARMACEUTICAL INDUSTRIES	27.930	0.1059
DIVIS LABORATORIES	33.510	0.0508
CIPLA	13.996	0.0271
RANBAXY LABORATORIES	19.019	0.0739
PIRAMAL ENTERPRISES	10.813	0.0461
DR REDDYS LABORATORIES	82.046	0.0255
GLAXO SMITHKLINE PHARMACEUTICALS	27.362	0.0204

The return and standard deviation of the ten pharmaceutical companies was calculated by taking the compounded average of the five years return and compounded average of daily change in return from 2009-14. All the stocks have a positive return.

Table 2: Selected Stocks for Optimal Portfolios

Name of the Stocks	$\frac{R_i - R_f}{\beta_i}$	$\frac{(R_i - R_f)\beta_i}{\sigma_{ei}^2}$	$\frac{\beta_i^2}{\sigma_{ei}^2}$	C_i
GLENMARK PHARMA	672.54	8182.90	12.17	89.89
LUPIN	620.78	6558.33	10.56	161.74
CADILA HEALTHCARE	551.29	10239.53	18.57	184.18
SUN PHARMACEUTICAL INDUSTRIES	506.27	773.43	1.53	120.87

The excess return-to-beta ratio is calculated and the stocks have been ranked in a descending order. The risk-free rate used is the average MIBOR rates calculated for the years 2009-14 which is equal to 7.57%. The cut-off rate is

calculated which comes to be $C^* = 184.18$. The stocks having excess return-to-beta ratio greater than the cut-off rate are selected in the optimal portfolio which are Glenmark Pharma, Lupin, Cadila Healthcare and Sun Pharmaceutical Industries.

Table 3: Percentage of Investment in the 4 Selected Stocks

Selected Stocks	β_i	$\sigma_{\epsilon_i}^2$	Z_i	$X_i(\%)$
GLENMARK PHARMA	0.0833	0.0570	713.719	33.57
LUPIN	0.0934	0.0826	493.761	23.22
CADILA HEALTHCARE	0.0856	0.0395	796.346	37.45
SUN PHARMACEUTICAL INDUSTRIES	0.0402	0.1059	122.355	5.75

Thus, the above study conducted reveals that 33.57% of money should be invested in Glenmark Pharma, followed by 23.22% in Lupin, 37.45% in Cadila Healthcare and a small percentage of 5.75% in Sun Pharmaceutical Industries.

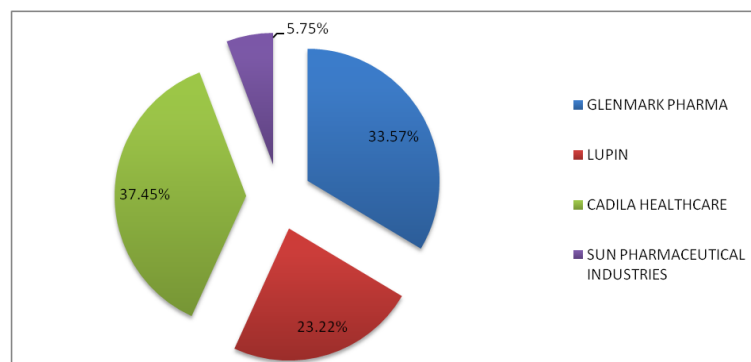


Figure 1: Proportion of Investment in Each Stock

CONCLUSIONS

The foundations of any developing economy depends on the health and education status in that particular country. The pharmaceutical industry has a major role to play in contributing towards the life expectancy of the growing young population of India. The study thus brings out the 4 best pharma companies to be invested into using the Sharpe model based on the five years data 2009-14.

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